Data Management and Data Analytics Capstone Topic Approval Form

Capstone Topic Approval Form

The purpose of this document is to help you clearly explain your capstone topic, project scope, and timeline. Identify each of the following areas so you will have a complete and realistic overview of your project. Your course instructor cannot approve your project topic without this information.

Student Name: Mason Krug

Student ID: #000545116

Capstone Project Name: Stock Price Prediction Using Machine Learning Techniques

Project Topic: Machine Learning to Explore Stock Price Prediction

Research Question: I will use machine learning techniques to answer the question "What will tomorrow's stock price be based on historical data?

> **Hypothesis:** My Machine Learning Model will forecast a stock's closing price to make informed decisions on whether to buy or sell based on past performance.

Context: Since the inception of Fidelity, WeBull, Robinhood, as well as many other Brokerage Firms, the barriers to entry for an individual into the world of stocks has been drastically reduced. The ability of person to buy and sell stocks no longer hinges on that person's ability to hire a financial advisor or brokerage. However, the complexity of the stock market can still seem extremely overwhelming. There are many factors to take in consideration when wanting to buy or sell a stock. Researching a company's performance and analyzing trends can be a time consuming and tedious task. To rectify this, my Firm has requested me to develop a tool that will present a forecasted stock price for a future date. By automatically downloading stock data and performing analysis using machine learning techniques, I will simplify the time-consuming and overwhelming decision on whether to buy a particular stock. My Firm's stakeholders will benefit by having the ability to make informed and automated decisions in a timely manner. My Firm's aim is for me to develop a tool that will allow for decisions that will optimize my Firm's financial future while alleviating the burden of manual data entry, searching, and analysis.

Data: I will need a stock's closing price, intraday high and low price, and trade volume per day for a given period.

> Stock data is publicly and freely available. I will be using Google Finance's API to gather the data I require for this project. The stocks I will be focused on will be stocks within the S&P 500 (blue chip stocks).

Data Gathering: My data gathering methodology will consists of publicly resources available on the internet.

Data Analytics Tools and Techniques: I will use ETL (Extract, Transform, Load) techniques used in prior courses to build a database of a stock of choice. I will perform regression techniques to analyze and summarize the data. Additionally, I will apply machine-learning techniques and processes that I have learned to analyze the data to make forecasts on a stock's closing price.

Justification of Tools/Techniques: For ETL, I will be using the Google Finance API to download the stock data of interest. The Google Finance API is well documented, freely available, and easy to use. I will use Python 3's MatPlotLib, Pandas, Numpy, SKLearn, and other modules to plot analyze, store, manipulate, perform analysis, and perform prediction on stock data.

Application Type, if applicable (select one):

☐ Mobile
☐ Web
☒ Stand-alone

Programming/Development Language(s), if applicable: Python

Operating System(s)/Platform(s), if applicable: N/A

Database Management System, if applicable: N/A

Project Outcomes: The key outcome of this project will be a next-day's forecast on a stock price. This outcome will be listed as text output as well as graphically using charts.

Projected Project End Date: 6/12/2021

Sources: Google Finance API for stock data.

Human Subjects or Proprietary Information
Does your project involve the potential use of human subjects? (Y/N): N
Does your project involve the potential use of proprietary company information? (Y/N): N

STUDENT SIGNATURE

X

Mason Krug

By signing and submitting this form, you acknowledge that any cost associated with the development and execution of your data analytics solution will be your (the student) responsibility.

TO BE FILLED BY A COURSE INSTRUCTOR

The capstone topic is approved by a course instructor.

COURSE INSTRUCTOR'S NAME AND SIGNATURE: William L. Dean, Jr.

COURSE INSTRUCTOR APPROVAL DATE: 19 May 2021

Project Compliance with IRB (Y/N): Y